CIMMYT
International Maize and Wheat Improvement Center

Fact sheet

Responding to climate change

Over 90% of work at the International Maize and Wheat Improvement Center (CIMMYT) relates to climate change, with breeding for drought tolerance stretching back to the 1970s.

Climate change is already happening. Without immediate action to bring cutting-edge research to farmers, climate change will be devastating to food security in the developing world.

At current rates of population growth, the productivity of maize and wheat is not being improved fast enough to meet consumer needs.

At the same time, rising global temperatures will reduce the yields that farmers can achieve with current varieties, by 6% per degree of warming in the case of wheat.

The tropical and subtropical areas targeted by CIMMYT are especially vulnerable to climate change, and are home to 90% of resource-poor farmers.

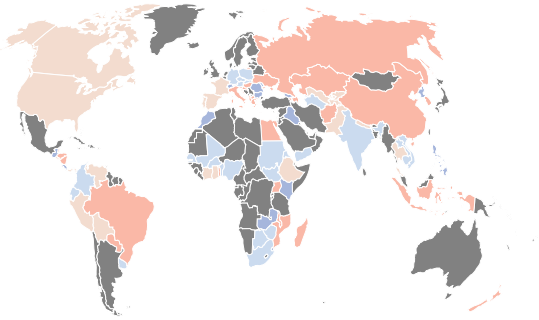
Droughts, high temperatures, erratic rainfall and flooding will become more frequent, and smallholder farmers must adapt to changing growing seasons, ecologies, crop diseases and pests.

While increasing production, we must reduce the climate footprint of agriculture, which accounts for 35% of greenhouse emissions in the developing world.

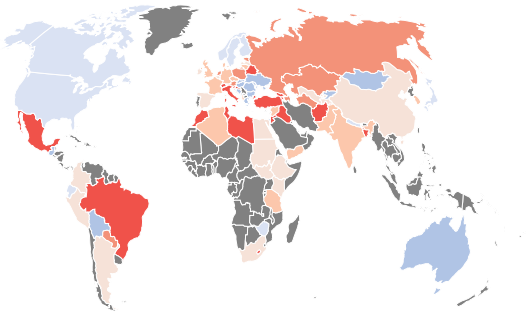
The strong 2015-2016 El Niño weather effect showed us a future in which agriculture does not adapt, affecting over 60 million people and requiring over US $3 billion in emergency aid for food security and agriculture.

Impacts of climate trends on crop yields, 1980-2008

Maize



Wheat



Change in yields (%)

(Adapted from Lobell, D., Schlenker, W. and Costa Roberts, J. 2011. Climate trends and global crop production since 1980. Science 333)

CIMMYT's Impacts

- Maize seed that yields more under drought produced through local companies for 5.4 million households in Africa in 2015.
- 18 heat-tolerant maize hybrids released in Asia in 2015.
- Wheat varieties released that produce bigger grains and that yield more in heat-stressed environments.
- Zero tillage tools for South Asia that can increase wheat yields by 20% while reducing water and fuel use, and land levelling to reduce irrigation needs by 15-20%
- Sensor technology that can reduce N_xO emissions – 300 times more potent a greenhouse gas than CO_2 – from wheat farming by 50% in Mexico.
- Climate data used to offer crop insurance to one million farmers in India.

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Our Work

Adaptation and mitigation while improving productivity.

The packages of technologies we bring to farmers are 'climate smart', meaning that they have more synergies than tradeoffs.

It is possible for farmers to produce more food and improve their incomes while using less resources and reducing their impact on the environment.

Adaptation

Prediction and analysis

CIMMYT works with partners to provide high-quality climate information in the developing world and predict the impacts of climate change on farmers.

In developing solutions, we also take into account research into how farmers make decisions and the role of factors such as gender or age.

Climate-tolerant crops

With over 70,000 examples of wheat and 30,000 of maize in our gene bank screened for heat and drought tolerance, CIMMYT uses a global breeding platform to develop climate-smart varieties.

We adopt the latest breeding technologies and support national systems and local seed companies to get affordable improved seed to farmers faster.

Climate-resilient agriculture

Better farming practices, reduced soil disturbance, crop rotation and intercropping can increase productivity while reducing the need for irrigation.

CIMMYT supports farmers with tested solutions and scale-appropriate machinery to apply these techniques and produce more while conserving soil resources under changing conditions.

Mitigation

Nutrient management

Fertilizer allows for high yields, but inefficient use causes greenhouse gas emissions to rise sharply. CIMMYT develops handheld or tractor-mounted tools so that farmers can precisely apply fertilizer.

Soil analysis, aerial images and decision support systems are used to deliver fertilizer recommendations via extension workers or mobile phone.

New research pathways

Agriculture must contribute to global emissions targets.

CIMMYT works on the possibility for soil carbon sequestration through conservation agriculture, reforestation as farmland becomes more productive, reduced fuel use in agriculture, and plant genetics to retain nitrogen in soils*.

** CIMMYT research on biological nitrification inhibition is led by the Japan International Research Center for Agricultural Science (JIRCAS)*

Creating transformational change

CIMMYT collaborates with the CGIAR Research Program on Climate Change (CCAFS) so that our work contributes to a global effort on climate change:

- Climate Smart Villages in India provide an example of how to scale out innovations through public-private partnerships.
- Research to improve data and models for tropical regions and nitrogen fertilizer efficiency to mitigate greenhouse gas emissions.
- Frameworks for smallholder farmers to access weather-based index insurance to support the adoption of new climate-smart varieties and technologies.

About CIMMYT

Headquartered in Mexico, the International Maize and Wheat Improvement Center (CIMMYT) is the global leader in publicly funded research for development for wheat and maize and for wheat- and maize-based farming systems.

CIMMYT works throughout the developing world with hundreds of partners, belongs to CGIAR and leads the CGIAR Research Programs on Wheat and Maize.

CIMMYT receives support from CGIAR Fund Donors, national governments, foundations, development banks and other public and private agencies.

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